



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/687,798	10/17/2003	Minwen Ji	200300737-1	9836

22879 7590 03/18/2008  
HEWLETT PACKARD COMPANY  
P O BOX 272400, 3404 E. HARMONY ROAD  
INTELLECTUAL PROPERTY ADMINISTRATION  
FORT COLLINS, CO 80527-2400

EXAMINER
----------

MUI, GARY

ART UNIT	PAPER NUMBER
----------	--------------

2616

NOTIFICATION DATE	DELIVERY MODE
-------------------	---------------

03/18/2008

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

JERRY.SHORMA@HP.COM  
mkraft@hp.com  
ipa.mail@hp.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/687,798	<b>Applicant(s)</b> JI, MINWEN	
	<b>Examiner</b> GARY MUI	<b>Art Unit</b> 2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 December 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-16, 19-27 and 29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 27 and 29 is/are allowed.
- 6) ☒ Claim(s) 1-16 and 19-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 – 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Cain et al. (US 4,905,233; hereinafter “Cain”).

For claim 1, Cain teaches forwarding a packet along a first link of the multipath network; tracking a load of the first link subsequent to forwarding the packet; and preserving the first link for a subsequent packet having the same flow address as the forwarded packet upon determining a desired load change of the first link is less than a predetermined value (see column 2 lines 36 – 55; packets are forwarded along a virtual circuit in a multinode communications network where the virtual circuit will remain dedicated for the connection between the source and destination until rerouting is required, for example traffic congestion).

For claim 2, Cain teaches modifying link designations to forward packets along upon determining the desired load change of the first link is greater than the predetermined value (see column 21 line 32 – column 2 line 3).

For claim 3, Cain teaches modifying link designations comprises designating a second link to send the subsequent packet along (see column 21 line 31 – column 2 line 3).

For claim 4, Cain teaches modifying link designations comprises preserving the link to send the subsequent packet along (see column 21 line 31 – column 2 line 3).

Art Unit: 2616

For claim 5, Cain teaches tracking the load comprises tracking one or more variables associated with the load of the first link (see column 22 lines 4 – 43).

For claim 6, Cain teaches the one or more variables comprise bandwidth of the first link (see column 22 lines 4 – 43).

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 7 – 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cain in view of Li et al. (US 6,381,252 B1).

For claims 7 and 8, Cain teaches all of the claimed subject matter with the exception of the one or more variables comprise a delay of the first link and the one or more variable comprises a loss rate of the first link. Li from the same field of endeavor teaches in the background the communication attributes measured can relate to that at least one parameter

such as latency, packet lost rate, and bandwidth (see column 2 lines 40 – 42). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to the variable be a delay or loss rate as taught by Li into the multiple path routing mechanism of Cain. The motivation for doing this is with more variables used in calculations the system will become more efficient.

For claim 9, Cain teaches to partition traffic flow through a multipath network (see column 2 lines 36 – 55; traffic is sent across a multinode network and a route selection will distribute the load). Cain fails to teach to adjust positions of one or more pointers used to partition traffic flow through a multipath network, wherein the positions of the one or more pointers are variable relative to a range of hash units that correspond to flow addresses within the multipath network. Li from the same field of endeavor teaches the use of pointers for selecting a channel (see column 4 lines 17 – 54). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the pointers as taught by Li into the multiple path routing mechanism of Cain. The motivation for doing this is allow for easy management of the plurality of network resources. Cain and Li also fails to teach the use of a hash unit, however hashing is well known at the time of the invention and therefore hash unit can be used in Cain's multiple path routing mechanism because hashing allows for a increase the speed of the system.

For claim 10, Cain fails to teach adjusting the positions of the one or more pointers comprise program instructions for modifying a position of one pointer at a time. Li from the same field of endeavor teaches the use of pointers for selecting a channel (see column 4 lines 17 – 54). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the

invention was made to use the pointers a taught by Li into the multiple path routing mechanism of Cain. The motivation for doing this is allow for easy management of the plurality of network resources.

For claim 11, Cain teaches tracking the load of the network links (see column 22 line 4 – 43) but fails to teach modifying a hash number of a first pointer positioned between a highest loaded link and a least loaded link; and subsequently modifying a hash number of a second pointer positioned between a second highest loaded link and a second least loaded link. Li from the same field of endeavor teaches the use of pointers, a first and a second that are adjusted, for selecting a channel (see column 4 lines 17 – 54). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the pointers a taught by Li into the multiple path routing mechanism of Cain. The motivation for doing this is allow for easy management of the plurality of network resources.

For claim 12, Cain fails to teach adjusting the positions of the one or more pointers are directed for use by an individual router of the multipath network. Li from the same field of endeavor teaches the use of pointers for selecting a channel (see column 4 lines 17 – 54). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the pointers a taught by Li into the multiple path routing mechanism of Cain. The motivation for doing this is allow for easy management of the plurality of network resources.

For claim 13, Cain teaches calculating an average amount of load per hash unit for individual links coupled to the router; and calculating a desired load change on the individual links (see column 22 lines 4 – 23).

For claim 14, Cain teaches selecting a link of the multipath network to send a packet along (see column 22 lines 4 – 23). Cain fails to teach a hash number representative of a flow address of the packet and relative hash numbers of one or more the pointers. Li from the same field of endeavor teaches the use of pointers for selecting a channel (see column 4 lines 17 – 54). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the pointers a taught by Li into the multiple path routing mechanism of Cain. The motivation for doing this is allow for easy management of the plurality of network resources.

For claim 15, Cain fails to teach hashing the flow address of the packet. However, hashing is well known at the time of the invention and therefore hash unit can be used in Cain's multiple path routing mechanism because hashing allows for an increase the speed of the system.

For claim 15, Cain teaches multiple ports for coupling to links of a network and selectively directing a data packet to one of the multiple ports (see column 2 line 24 – 55 and figure 3, nodes connected through multiple links and a route selection will choose the optimal route). Cain fails to teach a storage medium comprising program instructions executable using a processor for selectively directing a data packet to one of the multiple ports; and altering one or more of the conditions by which the data packet is selectively directed. . Li from the same field of endeavor teaches the use of pointers, a first and a second that are adjusted, for selecting a channel (see column 4 lines 17 – 54). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the pointers a taught by Li into the multiple path routing mechanism of Cain. The motivation for doing this is allow for easy management of the plurality of network resources

For claim 17, Cain fails to teach the one or more conditions comprise hash number values of one or more variable pointers configured to partition a range of hash numbers associated with possible flow addresses of the data packet. Li from the same field of endeavor teaches the use of pointers for selecting a channel (see column 4 lines 17 – 54). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the pointers a taught by Li into the multiple path routing mechanism of Cain. The motivation for doing this is allow for easy management of the plurality of network resources. Cain and Li also fails to teach the use of a hash unit, however hashing is well known at the time of the invention and therefore hash unit can be used in Cain's multiple path routing mechanism because hashing allows for a increase the speed of the system.

For claim 18, Cain fails to teach the one or more conditions comprise specific hash number ranges associated with possible flow addresses of the data packet. However, hashing is well known at the time of the invention and therefore hash unit can be used in Cain's multiple path routing mechanism because hashing allows for an increase the speed of the system.

For claim 19, Cain fails to teach altering the one or more conditions to reflect a load balancing policy of the router. Li from the same field of endeavor teaches the use of the pointers that adjusted to reflect the selected channel where the selected channel is from examining its status (see column 4 line 17 – 54). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the pointers a taught by Li into the multiple path routing mechanism of Cain. The motivation for doing this is allow for easy management of the plurality of network resources.



For claim 20, Cain fails to teach accounting for the capacity of the links coupled to the multiple ports when the one or more conditions are altered. Li from the same field of endeavor teaches the use of the pointers that adjusted to reflect the selected channel where the selected channel is from examining its status (see column 4 line 17 – 54). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the pointers a taught by Li into the multiple path routing mechanism of Cain. The motivation for doing this is allow for easy management of the plurality of network resources.

For claim 21, Cain fails to each altering the one or more conditions to monotonically balance loads between two of the multiple ports. Li from the same field of endeavor teaches the use of the pointers that adjusted to reflect the selected channel where the selected channel is from examining its status (see column 4 line 17 – 54). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the pointers a taught by Li into the multiple path routing mechanism of Cain. The motivation for doing this is allow for easy management of the plurality of network resources.

For claim 22, Cain fails to teach redirecting the data packet to another of the multiple ports upon detecting the one multiple port cannot accept the data packet. Li from the same field of endeavor teaches the use of the pointers that adjusted to reflect the selected channel where the selected channel is from examining its status and will adjust pointer again until it finds a positive status (see column 4 line 17 – 54). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the pointers a taught by

Li into the multiple path routing mechanism of Cain. The motivation for doing this is allow for easy management of the plurality of network resources.

For claim 23, Cain teaches multiple stations configured to send and receive data packets; and a plurality of routers interposed between the multiple stations and interconnected by a mesh of links, wherein each router is configured to selectively direct a first packet along a link coupled thereto in accordance with one or more variable pointers included within the router; and record the status of the one or more variable pointers to direct a second packet having the same source and flow addresses as the first packet along the same link (see column 2 line 36 – 55; in a multinode network packets are sent along a virtual circuit). Cain fails to teach the use of pointers. Li from the same field of endeavor teaches the use of pointers for selecting a channel (see column 4 lines 17 – 54). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the pointers a taught by Li into the multiple path routing mechanism of Cain. The motivation for doing this is allow for easy management of the plurality of network resources.

For claim 24, Cain fails to teach alter the position of one or more variable pointers. Li from the same field of endeavor teaches the use of pointers for selecting a channel (see column 4 lines 17 – 54). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the pointers a taught by Li into the multiple path routing mechanism of Cain. The motivation for doing this is allow for easy management of the plurality of network resources.

For claim 25, Cain teaches tracking the load conditions of the links coupled thereto (see column 22 lines 15 – 43).

For claim 26, Cain teaches at least one router of the plurality of routers comprises a means for changing transmission control protocol connections among links of differing loss rates associated with the router (see column 22 lines 15 – 43).

***Allowable Subject Matter***

6. Claims 27 and 29 are allowed.

***Response to Arguments***

7. Applicant's arguments filed December 27, 2007 have been fully considered but they are not persuasive. Claims 17, 18, and 28 have been cancelled. Claims 1 – 16, 19 – 27, and 29 are currently pending.

In regards to the remarks, in particular that the Cain reference does not teach or even suggest a decision regarding "preserving the first link" that is based upon whether "a desired load change of the first link is less than a predetermine value". The examiner respectfully disagrees. In the Cain reference it teaches that it is "appropriate to transmit information from a source to a destination so that it travels the same path and arrives at the destination in sequences" (see column 21 lines 31 - 35). This implies that the link is preserved since it is the same path that is used to transmit information. Also in the Cain reference it teaches "the virtual circuit route from source to destination will remain dedicated for that purpose until rerouting is required, either due to link failure along the route or due to traffic congestion" (see column 21 lines 55 – 59). This implies that the link will remain dedicated until there is

traffic congestion (load changed to a high value). Therefore, the claims are rejectable under Cain.

In regards to the remarks, in particular that the Li reference does not teach or even suggest “using one or more pointer to partition traffic flow by defining boundaries between ranges of hashed flow addresses”. The examiner respectfully disagrees. In the Li reference it teaches the use of pointers to select a channel where the channel can be a positive or negative status so that the flow of the data is controlled and there is a range of channel number that it can select from and where the channel numbers can be hashed (see column 4 lines 17 – 54 and figure 3). Therefore, the claims are rejectable under Li.

### ***Conclusion***

8. **Examiner's Note:** Examiner has cited particular paragraphs or columns and line numbers in the references applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing responses, to fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner.

In the case of amending the claimed invention, Applicant is respectfully requested to indicate the portion(s) of the specification which dictate(s) the structure relied on for proper interpretation and also to verify and ascertain the metes and bounds of the claimed invention.

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to GARY MUI whose telephone number is (571)270-1420. The examiner can normally be reached on Mon. - Thurs. 9 - 3 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Ngo can be reached on (571) 272-3139. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

Art Unit: 2616

like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ricky Ngo/  
Supervisory Patent Examiner, Art Unit  
2616

/Gary Mui/  
Examiner, Art Unit 2616  
03/05/2008